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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/775,660	02/09/2004	Xiaohe Chen	200300677-1	1438

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INTELLECTUAL PROPERTY ADMINISTRATION
FORT COLLINS, CO 80527-2400

EXAMINER

NILAND, PATRICK DENNIS

ART UNIT	PAPER NUMBER
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1796

NOTIFICATION DATE	DELIVERY MODE
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03/18/2008

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/775,660	Applicant(s) CHEN ET AL.	
	Examiner Patrick D. Niland	Art Unit 1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 December 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

1. The amendment of 12/11/07 has been entered. Claims 1-25 are pending.

2. Claims 1-25 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

A. The originally filed specification does not provide basis for "and wherein the amount of water soluble polyurethane present in the ink composition is fully dissolved". This limitation of the amendment of 12/7/06 is therefore new matter.

B. The originally filed specification does not provide basis for the new recitation of "only one resin, the only one resin being" of the newly amended claims. The effective exclusion of other resins is therefore new matter since it is not supported by the originally filed specification. See Ex parte Grasselli, 231 USPQ 393-395.

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

A. It is unclear what is intended by "fully dissolved". The polyurethanes disclosed contain numerous hydrophobic sites, e.g. urethane groups, alkylene moieties, etc. These portions will not dissolve in water. The polyurethanes cannot therefore be fully dissolved. The instant claims recite amounts of about 0.1-5% by weight resin, water solubility limit of at least 0.1%, and

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require the resin to be “fully dissolved” though the composition contains alkyldiol and pigment, thus rendering the amount of water less by the amounts of these components which need not aid dissolution. Thus, it is unclear how the composition containing 0.1-5 wt.% of 0.1% solubility limit can be made. This further raises the issue of what “fully dissolved” is intended to mean.

B. Claim 1 recites that the ink comprises about 0.1 to 5% by weight of water-soluble polyurethane that has water-solubility limit of “at least 0.1%” and also that the polyurethane is “fully dissolved”. Given that the water-solubility limit of the polyurethane is only “at least 0.1%” and the ink comprises about 0.1 to 5% water-soluble polyurethane, the scope of the claim is confusing given that it is not clear how the polyurethane is fully dissolved. That is, if the ink comprises 5% water-soluble polyurethane with water-solubility limit of 0.1%, it is clear how the water-soluble polyurethane is fully dissolved. Clarification is requested. The applicant’s arguments are noted, but in view of the lack of clarity of “fully dissolved” noted above and the use of less water than would be in the lower solubility limit test in the claimed compositions, it remains unclear how the lower solubility limit polyurethane can be fully dissolved in the claimed composition. This rejection is therefore maintained.

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

6. Claims 1-4, 6-10, 17-23, and 25 are rejected under 35 U.S.C. 102(a) as being anticipated by WO 03/097753 as interpreted by US Pat. Application Publication US 2004/0242726 Waki et al..

Waki discloses ink jet ink comprising 0.5-25%, preferably, 2-10% pigment, water-soluble polyurethane possessing acid number of 5-100, preferably 10-80, 1-15%, preferably 2-10%, C₁-C₈ alkanediol, and 5-20%, preferably 6-25%, co-solvent such as 1,3-dimethyl-2-imidazolidinone and 2-pyrrolidone. It is disclosed that the ratio of polyurethane to pigment is 5-100/100 and thus, it is calculated, based on the amount of pigment, that the polyurethane is present in amount of 0.1-10%. The ink does not require surfactant. The ink possesses viscosity of at most 20 cP, which implies the molecular weight of the instant claims 4, 22, and 23 by definition of viscosity molecular weight. Further, there is disclosed process for printing an image into paper substrate using ink jet printer. Although there is no explicit disclosure of ink cartridge, it is clear that the printer would necessarily inherently possess ink cartridge to store ink (paragraphs 1, 10, 13, 17-18, 20, 25, 56-57, 66-67, 133, 136, 138, 141, 145, 147, and 161). Given that WO 03/097753 disclose that the polyurethane is water-soluble and further given that the polyurethane possesses acid number as presently claimed, it is clear that the polyurethane would inherently possess water-solubility limit as presently claimed and would inherently be fully dissolved as presently claimed. The applicant's arguments that the instant claims require "only one resin, the only one resin being a water soluble polyurethane" are noted. However, it is noted that both resins of Waki may be water soluble polyurethanes. See sections [0014] and [0056]-[0057]. It is noted that polymers are mixtures of molecules differing by many things such as molecular weight, monomer content and sequence, functionality, etc. as evidenced by the average polymer concepts such as average molecular weight, average functionality, etc. Therefore, the mixture of polyurethane molecules that are water soluble of Waki meets the instant claim limitation which

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does not specify the identity of the polyurethane since they are all water soluble polyurethane resin. This rejection is therefore maintained.

In light of the above, it is clear that WO 03/097753 anticipates the present claims.

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claims 5 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 03/097753 as interpreted by US Pat. Application Publication US 2004/0242726 Waki et al..

The disclosure with respect to WO 03/097753 in paragraph 6 above is incorporated here by reference.

The difference between WO 03/097753 and the present claimed invention is the requirement in the claims of acid number of the polyurethane.

WO 03/097753 discloses that the polyurethane possesses acid number of 5-100, preferably, 10-80, while the present claims require polyurethane possessing acid number of 30-70 or 40-60.

However, as set forth in MPEP 2144.05, in the case where the claimed range “overlap or lie inside ranges disclosed by the prior art”, a *prima facie* case of obviousness exists, *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990). Further, it would have been within the skill level of one of ordinary skill in the art to recognize that controlling the acid number of the polyurethane controls the properties of the polyurethane and thus, the ink, such as water resistance, storage stability, viscosity, etc.

In light of the above, it therefore would have been obvious to one of ordinary skill in the art to utilize polyurethane in WO 03/097753 with acid number, including that presently claimed, in order to produce ink with desired properties, and thereby arrive at the claimed invention.

The applicant's arguments that the instant claims require “only one resin, the only one resin being a water soluble polyurethane” are noted. However, it is noted that both resins of

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Waki may be water soluble polyurethanes. See sections [0014] and [0056]-[0057]. It is noted that polymers are mixtures of molecules differing by many things such as molecular weight, monomer content and sequence, functionality, etc. as evidenced by the average polymer concepts such as average molecular weight, average functionality, etc. Therefore, the mixture of polyurethane molecules that are water soluble of Waki meets the instant claim limitation which does not specify the identity of the polyurethane since they are all water soluble polyurethane resin. This rejection is therefore maintained.

10. Claims 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 03/097753 as interpreted by US Pat. Application Publication US 2004/0242726 Waki et al. in view of Iu et al. (U.S. 6,102,998).

The disclosure with respect to WO 03/097753 in paragraph 6 above is incorporated here by reference.

The difference between WO 03/097753 and the present claimed invention is the requirement in the claims of specific solvent.

Iu et al., which is drawn to ink jet ink, disclose the use of hydantoin solvent identical to that presently claimed in order to produce ink with enhanced image quality, waterfastness, and dry time (col.4, lines41-65 and col.9, lines 20-24).

In light of the motivation for using hydantoin solvent disclosed by Iu et al. as described above, it therefore would have been obvious to one of ordinary skill in the art to use such hydantoin solvent in the ink of WO 03/097753 in order to produce ink with enhanced image quality, waterfastness, and dry time, and thereby arrive at the claimed invention.

The applicant's arguments that the instant claims require "only one resin, the only one resin being a water soluble polyurethane" are noted. However, it is noted that both resins of Waki may be water soluble polyurethanes. See sections [0014] and [0056]-[0057]. It is noted that polymers are mixtures of molecules differing by many things such as molecular weight, monomer content and sequence, functionality, etc. as evidenced by the average polymer concepts such as average molecular weight, average functionality, etc. Therefore, the mixture of polyurethane molecules that are water soluble of Waki meets the instant claim limitation which does not specify the identity of the polyurethane since they are all water soluble polyurethane resin. This rejection is therefore maintained.

11. Claims 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 03/097753 as interpreted by US Pat. Application Publication US 2004/0242726 Waki et al., in view of Ma et al. (U.S. 5,648,405).

The disclosure with respect to WO 03/097753 in paragraph 6 above is incorporated here by reference.

The difference between WO 03/097753 and the present claimed invention is the requirement in the claims of surface tension of the ink.

Ma et al., which is drawn to ink jet ink, disclose that in order for ink to be suitable for ink jet printing the ink must possess surface tension of 20-70 dyne/cm given that the jet velocity, separation length of droplets, drop size, and stream stability of the ink are effected by surface tension (col.5, lines 39-45).

In light of the motivation for using ink with specific surface tension disclosed by Ma et al. as described above, it therefore would have been obvious to one of ordinary skill in the art to

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use ink with such surface tension, including that presently claimed, in order that the ink is suitable for, and effectively utilized in, ink jet printing, and thereby arrive at the claimed invention.

The applicant's arguments that the instant claims require "only one resin, the only one resin being a water soluble polyurethane" are noted. However, it is noted that both resins of Waki may be water soluble polyurethanes. See sections [0014] and [0056]-[0057]. It is noted that polymers are mixtures of molecules differing by many things such as molecular weight, monomer content and sequence, functionality, etc. as evidenced by the average polymer concepts such as average molecular weight, average functionality, etc. Therefore, the mixture of polyurethane molecules that are water soluble of Waki meets the instant claim limitation which does not specify the identity of the polyurethane since they are all water soluble polyurethane resin. This rejection is therefore maintained.

12. Claims 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 03/097753 as interpreted by US Pat. Application Publication US 2004/0242726 Waki et al., in view of Elwakil (U.S. 5,833,743).

The disclosure with respect to WO 03/097753 in paragraph 6 above is incorporated here by reference.

The difference between WO 03/097753 and the present claimed invention is the requirement in the claims of pH of the ink.

Elwakil, which is drawn to ink jet ink, disclose the use of ink possessing pH of 9-11 in order to prevent the ink from corroding the printer (col.5, lines 8-19).

In light of the motivation for using ink with specific pH disclosed by Elwakil as described above, it therefore would have been obvious to one of ordinary skill in the art to control the pH of the ink of WO 03/097753 to such values in order that the ink does not corrode the printer, and thereby arrive at the claimed invention.

The applicant's arguments that the instant claims require "only one resin, the only one resin being a water soluble polyurethane" are noted. However, it is noted that both resins of Waki may be water soluble polyurethanes. See sections [0014] and [0056]-[0057]. It is noted that polymers are mixtures of molecules differing by many things such as molecular weight, monomer content and sequence, functionality, etc. as evidenced by the average polymer concepts such as average molecular weight, average functionality, etc. Therefore, the mixture of polyurethane molecules that are water soluble of Waki meets the instant claim limitation which does not specify the identity of the polyurethane since they are all water soluble polyurethane resin. This rejection is therefore maintained.

Response to Arguments

1. Applicants' arguments filed 6/22/07 have been fully considered but they are not persuasive.

Specifically, applicants argue that WO 03/097753 is not a relevant reference against the present claims given that there is no disclosure that the water-soluble polyurethane is fully dissolved as required in all the present claims. Applicants argue that WO 03/097753 in fact teaches away from water-soluble polyurethane given that the polyurethane of WO 03/09775 is crosslinked and further given that WO 03/097753 discloses gel content.

However, while in one embodiment WO 03/097753 discloses forming pigment dispersion by mixing the pigment and water-soluble resin, kneading the mixture, dispersing, adding the water-soluble polyurethane, and then crosslinking, in another embodiment, crosslinking occurs first followed by adding the water-soluble polyurethane (paragraph 69 (lines 9-11)). In the latter embodiment, while the water-soluble resin is crosslinked, the water-soluble polyurethane is not. Further, while paragraphs 112-118 of WO 03/097753 discloses the gel fraction, i.e. crosslinking rate of a resin in a dispersion, this crosslinking rate does not necessarily refer to the water-soluble polyurethane but can refer to the water-soluble resin. There is no requirement in WO 03/097753 that the polyurethane is crosslinked. While it is the preferred embodiment in WO 03/097753 that both the water-soluble resin and the water-soluble polyurethane are crosslinked, it is noted that “nonpreferred disclosures can be used. A nonpreferred portion of a reference disclosure is just as significant as the preferred portion in assessing the patentability of claims”, *In re Nehrenberg*, 280 F.2d 161, 126 USPQ 383 (CCPA 1960).

Thus, the examiner’s position remains that given that WO 03/097753 disclose that the polyurethane is water-soluble and further given that the polyurethane possesses acid number as presently claimed, it is clear that the polyurethane would inherently possess water-solubility limit as presently claimed and would inherently be fully dissolved as presently claimed.

As evidence regarding such unpredictability, applicants point to inks C and E on page 15 of the present specification and note that comparison of these examples shows that the addition of 1,2-alkyldiol can have an immense impact on different properties of an ink.

However, firstly, it is noted that while ink C, which utilizes higher amount of 1,2-alkyldiol, has lower drytime but worse firing stability than ink E, both ink C and ink E comprise amounts of polyurethane and 1,2-alkyldiol that fall within the scope of the present claims. Thus, both ink C and ink E are inks within the scope of the present claims. Further, there is no requirement in the present claims regarding drytime or firing stability. Thus, while ink C has poor firing stability as compared to ink E, ink C remains an inventive ink. Therefore, while the comparison of ink C with ink E shows that the use of different amounts of 1,2-alkyldiol can negatively effect properties of the ink, there is no evidence that the of 1,2-alkyldiol in Hirasa et al. would negatively effect the ink to the extent that they are not within the scope of the present claims. Additionally, it is within the skill level of one of ordinary skill in the art to control the amounts of ingredients in the ink including 1,2-alkyldiol and polyurethane to produce ink with desired properties.

Applicants also argue that while Ma et al. disclose desirability of inks with viscosity less than 10 cP, this falls far short of teaching specifically claimed viscosity ranges. Applicants also note that claims 13-14 further require that the ink has specific surface tension.

However, it is noted that as set forth in MPEP 2144.05, in the case where the claimed range “overlap or lie inside ranges disclosed by the prior art”, a *prima facie* case of obviousness exists, *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990).

Further, it is significant to note that Ma et al. disclose that jet velocity, separation length of droplets, drop size, and stream stability are greatly affected by the viscosity of the ink and that

ink suitable for ink jet printing should possess viscosity less than 10 cP. Therefore, it would have been obvious to one of ordinary skill in the art to control viscosity of ink of Hirasa et al. to values, including that presently claimed, in order to produce ink that is effectively utilized in, and printed from, ink jet printer, and thereby arrive at the claimed invention.

Further, it is noted that Hirasa et al. teach that the ink possesses surface tension of 30-35 dyne/cm (paragraph 51).

2. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patrick D. Niland whose telephone number is 571-272-1121. The examiner can normally be reached on 4-10 M-R.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu can be reached on 571-272-1114. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/Patrick D Niland/
Primary Examiner
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